ONTARIO MINISTRY OF ENVIRONMENT
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OPERATING SUMMARY

1972

BURLINGTON-SKYWAY

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Burlington ~ Skyway : water
pollution control plant.

81587

Ontario

Ministry of the
Environment

135 St. Clair Avenue West
Toronto 195, Ontario

We are pleased to present you with the 1972 operating summary for the water pollution control plant serving your community.

This summary contains data on the performance of the plant as well as relevant financial information. Of particular interest is the review of the year's activities in which significant items of these data are discussed in some detail by the operations engineer and his staff who, by their day-to-day involvement with the operation, are thoroughly familiar with the plant.

We appreciate your continuing interest in protecting the environment through the efficient operation of this wastewater treatment facility.

DS Caverly
D.S. Caverly,
Assistant Deputy Minister.

D McTavish
D.A. McTavish, P. Eng.,
Director,
Project Operations Branch.

Environment Ontario

TD
227
.S8
S69
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1979

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MINISTRY OF THE ENVIRONMENT

MINISTER
Honourable James A.C. Auld

DEPUTY MINISTER
E. Biggs

ASSISTANT DEPUTY MINISTER
D.S. Caverly

EXECUTIVE DIRECTOR
K.H. Sharpe

PROJECT OPERATIONS BRANCH

DIRECTOR
D.A. McTavish

ASSISTANT DIRECTOR
C.W. Perry

REGIONAL SUPERVISOR
P.J. Osmond

OPERATIONS ENGINEER
A. Clark

135 St. Clair Avenue West
Toronto 195

BURLINGTON-SKYWAY

WATER POLLUTION CONTROL PLANT

operated for

THE TOWN OF BURLINGTON

by the

MINISTRY OF THE ENVIRONMENT

1972 ANNUAL OPERATING SUMMARY

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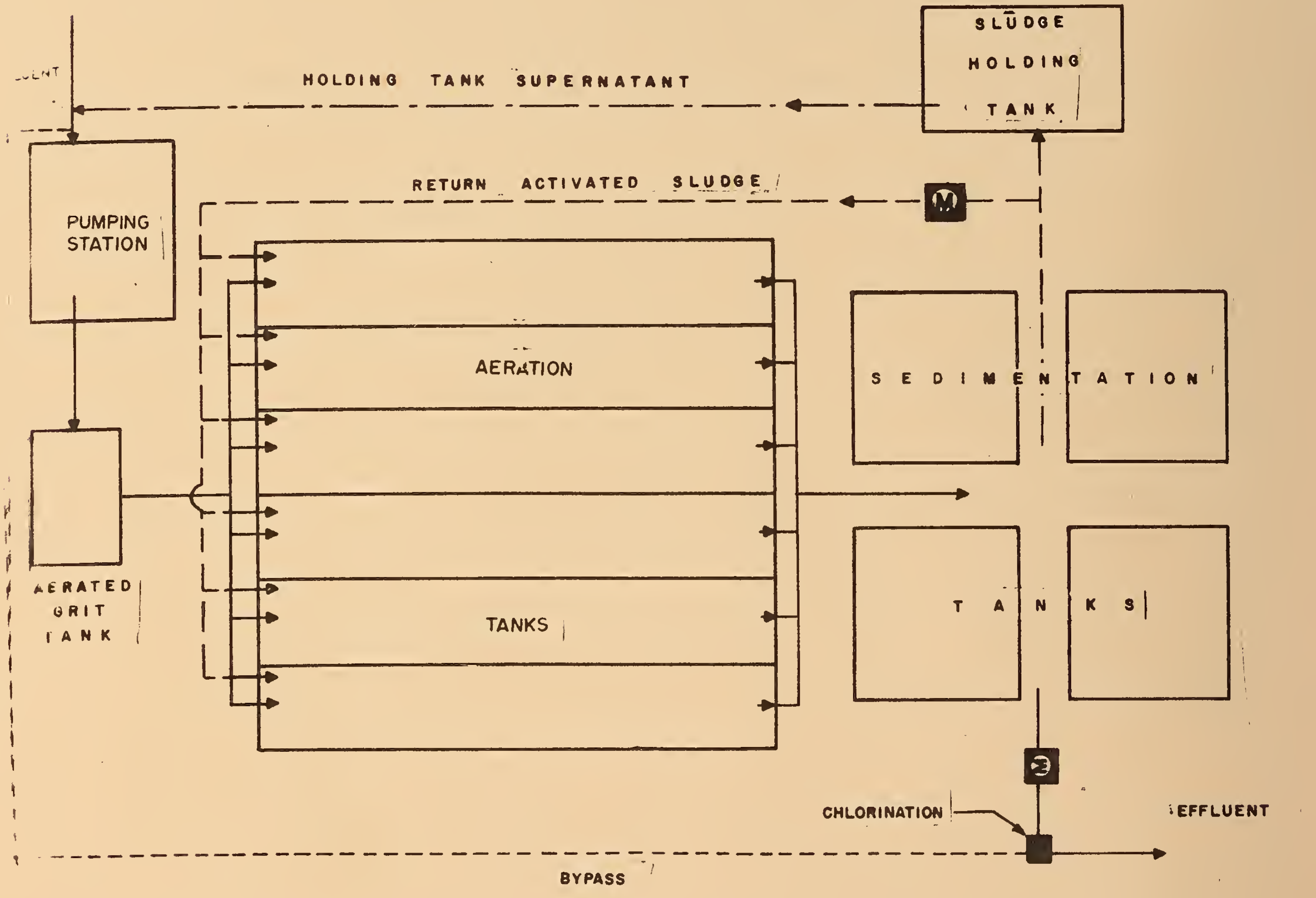
BURLINGTON SKYWAY
WATER POLLUTION CONTROL PLANT



DESIGN DATA

PROJECT NO.	2-0105-62
DESIGN FLOW	6 mgd
BOD - Raw Sewage	200 mg/l
SS - Raw Sewage	200 mg/l

PRETREATMENT

Coarse Screening

Type: Link Belt, mechanically-cleaned
Size: 2½" space

Lift Station Pumps (@ 30' tdh)

2 @ 6 mgd each; 2 @ 5 mgd each

Screening

Type: Link Belt, mechanically-cleaned
Size: 1" space

Grit Removal

Type: Air degritter
Size: One 20.3' x 25' x 14.2'
Retention: 20.8 min

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, single pass
Size: Six 270' x 27' x 15'
(660,300 ft. or 4.12 mil gal)
Retention: 16.5 hr
Loading: 9.5 lb BOD/1000 ft^3

Air Supply

Type: Hoffman multi-stage centrifugal blowers
Size: 3-4000 cfm (max), 1-6000 (max)

Diffusers

Type: Saran-covered flexofusers
Spacing: 250 tubes per tank

Secondary Sedimentation

Type: Eimco
Size: Four 60' x 60' x 12' swd
(538,000 gal)
Retention: 4.1 hours
Loading: Surface, 434 gal/ft^2/day
Weir, 7,100 gal/ft/day

CHLORINATION

Type: Fischer & Porter
Size: Two 2000 lb/day

Chlorine Contact Chamber

- nil
- chlorination in outfall

OUTFALL

- to Hamilton Harbour

SLUDGE HANDLING

Type: Thickening tank, decanted
Size: One 20' dia x 9' depth
(2830 ft^3 or 1760 gal)

'72 Review

GENERAL

The Burlington Skyway project consists of a 6.0 mgd secondary water pollution control plant utilizing the extended aeration form of the activated sludge treatment process. The plant is located on Lakeshore Road at the north end of the Skyway Bridge.

Plant effluent is discharged to Hamilton Harbour. Thickened waste activated sludge is removed by tank truck for land disposal.

This plant is the largest of the three Ministry of the Environment operated treatment facilities in the Town of Burlington and acts as the operating headquarters for all the Burlington projects.

Municipal forces operate the sewage collection system including 15 pumping stations, three of which are Ministry financed. The cost of operating the collection system and pumping stations, is not reflected in the costs shown in the body of this report.

Construction work for a plant expansion from 6.0 mgd to 8.0 mgd and plant scale phosphorus removal studies are both scheduled to commence early in 1973.

EXPENDITURES

The 1972 operating costs were $127,077.69, up from $106,921.24 in 1971. The change was due primarily to changing the portion of the total Burlington projects salary cost allocated to this project from 50 to 60 percent.

The overall cost of operating all of the Ministry operated Burlington projects increased from $180,958.75 in 1971 to $191,736.72 in 1972, for an increase of 6 percent. The unit cost of operation was $43 per million gallons, as compared with $52 per million gallons in 1971.

PLANT FLOWS AND CHLORINATION

Plant flows increased 45 percent in 1972 over 1971. Average daily flows for the year were 8.1 million gallons, and exceeded the plant design capacity 90 percent of the time. Average daily flows during the last two months of the year were 10.2 million gallons.

The flows from nearly all new development in the Town during the past two years have been directed to the Skyway plant. The plant is unable to handle present flows during periods of high infiltration and the storage capacity of the trunk sewer must be utilized with increasing frequency. Plant bypassing was necessary during several periods of high flow.

Chlorination is carried out between May 15 and October 15. The dosage required to maintain a 15 minute chlorine residual of 0.5 mg/l in the effluent averaged 2.3 mg/l, down from the 3.3 mg/l level required during 1970 and 1971.

In addition, 2,500 pounds of chlorine was used to treat flows in excess of plant capacity during November and December which had to be bypassed.

PLANT EFFICIENCY

During 1972 the raw sewage strength averaged 170 mg/l BOD and 240 mg/l suspended solids, as compared to 199 mg/l BOD and 242 mg/l suspended solids in 1971. The total plant loading during 1972 averaged 13,800 pounds of BOD and 19,500 pounds of suspended solids per day as compared to 11,100 pounds of BOD and 13,500 pounds of suspended solids during 1971. This represents an increase in BOD loading of 25 percent and an increase in suspended solids loading of 44 percent over 1971.

Removal efficiencies for BOD and suspended solids were 95 percent and 94 percent respectively, lower than in 1971. The effluent quality averaged 9 mg/l BOD and 13 mg/l suspended solids, also a deterioration from 1971, but still indicative of a well operated plant, considering the high flows being treated.

Phosphorus levels in the raw sewage averaged 7.1 mg/l in 1972 as compared to 9.2 mg/l in 1971 and averaged 3.2 mg/l in the final effluent in 1972 as compared to 4.0 mg/l in the previous year. These figures indicate that approximately 41 tons of phosphorus was discharged into Hamilton Harbour during 1971 and 47 tons was discharged in 1972.

SLUDGE DISPOSAL

A total of 10,582 cubic yards of thickened activated sludge was removed from the plant during the year, down slightly from the 1971 level of 11,348 cubic yards.

CONCLUSIONS

The plant operated at an average of 135 percent of hydraulic design capacity during 1972 as compared with only 93 percent in the previous year and at an average of 174 percent of hydraulic design capacity during the last two months of the year.

It is anticipated that flows during 1973 will average at least 9.0 mgd and may be as high as 10.0 mgd. Stage 1 expansion, scheduled to start early in 1973 will only increase capacity to 8.0 mgd. Stage 2 expansion will bring the plant capacity up to 9.5 mgd. Stage 3 expansion will give the plant a capacity of approximately 11.0 mgd.

It is recommended that the plant be expanded to the stage 3 level as quickly as possible and that the Drury Lane and Elizabeth Gardens plants be kept in operation until the Skyway plant has been expanded sufficiently above the stage 3 level to accept these additional flows.

Treatment efficiency and effluent quality during the year were lower than during 1971 but still quite good and were excellent for a plant operating at 135 percent of hydraulic design capacity.

PROJECT COSTS

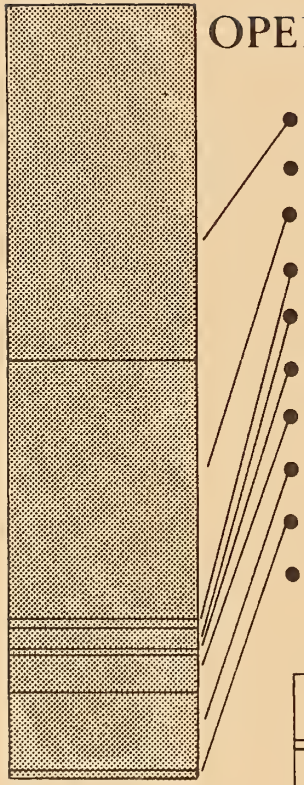
NET CAPITAL COST	$1,796,844.53
DEDUCT - Portion financed by CMHC	(1,240,059.57)
Long Term Debt to MOE	$ 556,784.96
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1972	$ 239,003.69
Net Operating	$ 132,716.30
Debt Retirement	11,453.00
Reserve	9,853.62
Interest Charged	31,223.93
TOTAL	$ 185,246.85

RESERVE ACCOUNT

Balance @ January 1, 1972	$ 60,388.26
Deposited by Municipality	9,853.62
Interest Earned	4,099.72
	$ 74,341.60
Less Expenditures	1,689.20
Balance @ December 31, 1972	$ 72,652.40

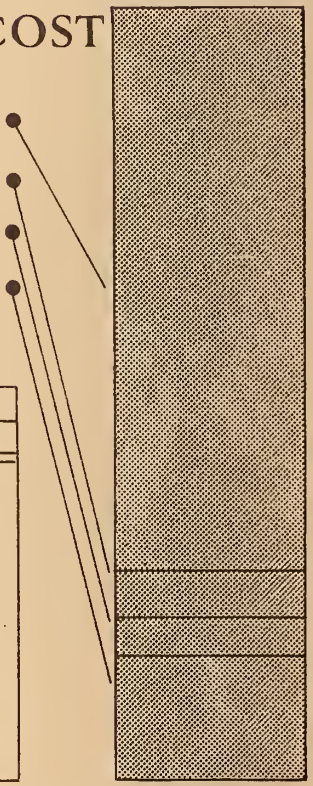
1972 COSTS

OPERATING COSTS



PAYROLL	46 %
FUEL	NIL %
POWER	33 %
CHEMICALS	1 %
GENERAL SUPPLIES	3 %
EQUIPMENT	< 1 %
REPAIRS & MAINTENANCE	4 %
SUNDRY	12 %
WATER	< 1 %
TRAVEL	Credit

TOTAL ANNUAL COST



NET OPERATING	72 %
DEBT RETIREMENT	6 %
RESERVE	5 %
INTEREST	17 %

YEARLY OPERATING COSTS

YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	TREATMENT COSTS	
			$ per million gal	¢ per lb BOD
1968	1365.20	69,386.01	50.82	4 cents
1969	1218.10	80,952.25	66.46	5 cents
1970	1500.1	103,062.06	68.70	5 cents
1971	2058.	106,921.74	52.00	2 cents
1972	2948.	127,077.69	43.10	2 cents

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	REGULAR PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY*	WATER	TRAVEL
JAN	4405.22	3839.07					108.06		399.84	58.25		
FEB	11456.29	4143.08			4951.17		276.04		130.88	1853.86	65.11	36.15
MAR	12096.06	4402.54			4351.91		199.63		276.99	2802.16	62.83	
APR	9348.73	4967.86			3717.33	93.65	434.53		49.61	15.70	70.05	
MAY	10855.86	4583.12			3970.68		141.79		174.80	1849.53	84.49	51.45
JUNE	13093.14	6625.44	1383.53		3349.50	123.04	492.58		1040.49	48.41	30.15	
JULY	4996.77	177.40			3341.83		301.68		404.28	710.27	61.31	
AUG	10635.42	4348.53	715.28		3788.59	1293.60	144.61	102.38	114.41	42.68	46.49	38.85
SEPT	15083.18	7869.83	826.00		3818.43		251.43		195.98	2073.50	48.01	
OCT	13104.38	8111.45	67.67		4253.86		106.45		461.17	27.46	76.32	
NOV	(1618.71)	(11607.52)	(257.26)		4671.38		97.31	41.69	312.51	5071.86	51.32	
DEC	33950.24	23669.26	638.06		4895.47	656.80	1207.57	345.04	1428.22	1390.63	59.49	(340.30)
TOTAL	** 137406.58	*** 61130.06	3373.28		45110.15	2167.09	3761.68	489.11	4989.18	15944.31	655.57	(213.85)

Brackets indicate credit.

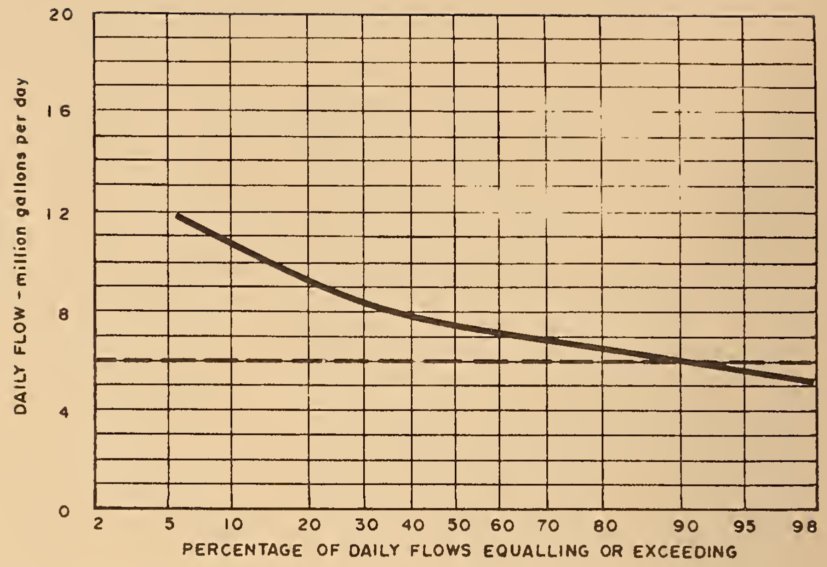
* Sundry includes sludge haulage costs of $10, 707.33

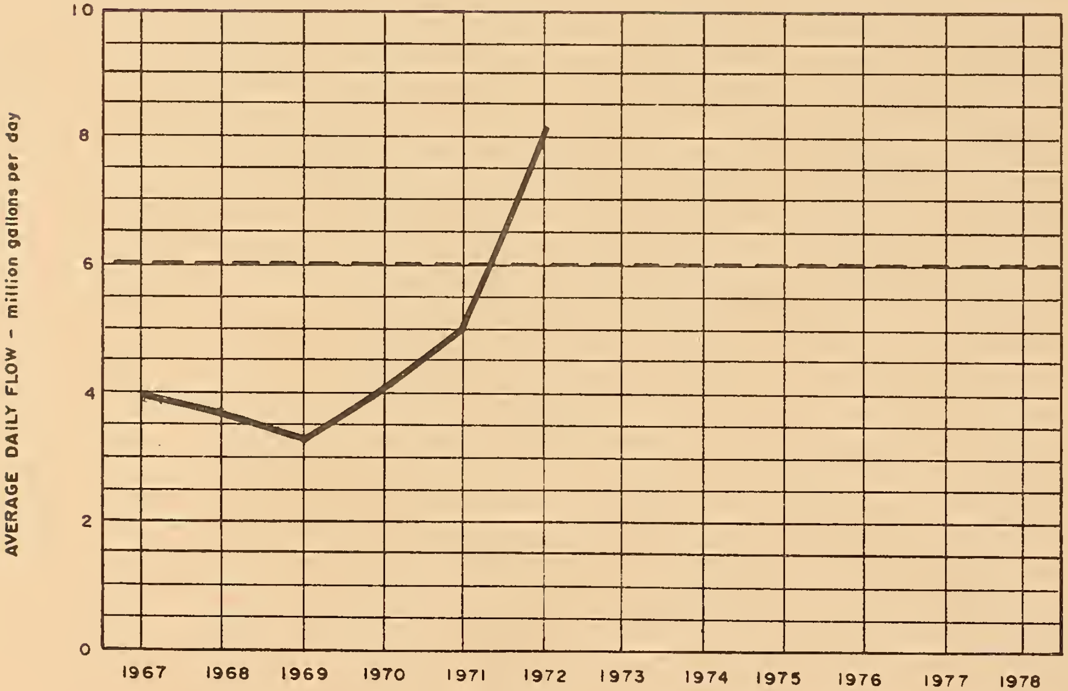
** Corrected March 73 to $127, 077.69

*** Corrected March 73 to $50, 801.17

PROCESS DATA

FLOWS



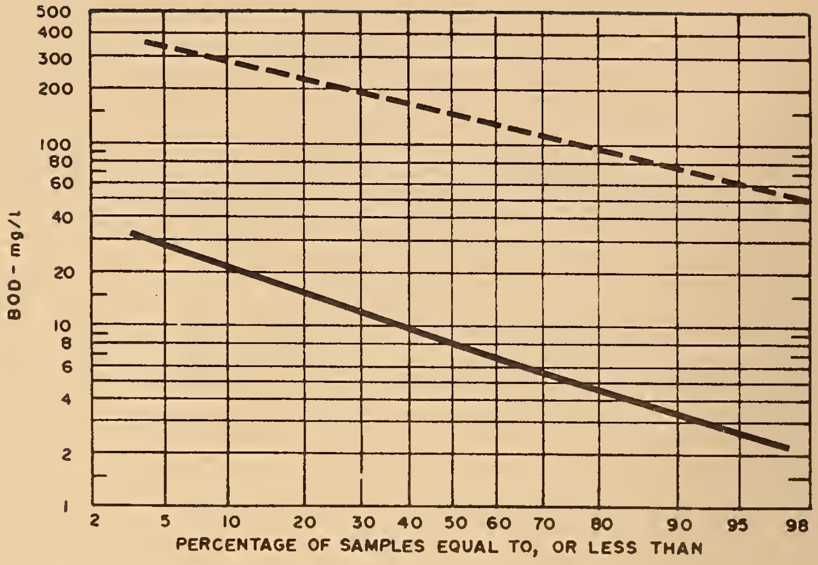


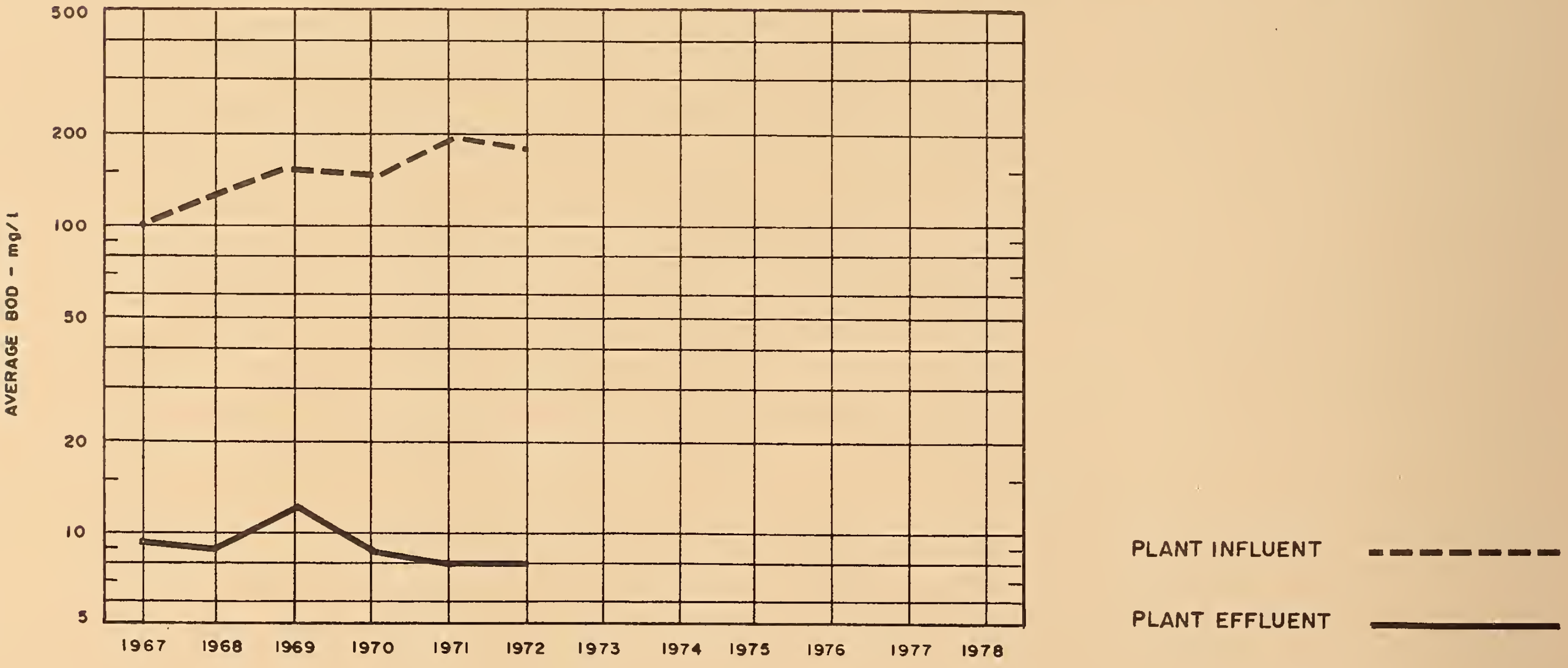
DESIGN CAPACITY — — — — — —

PLANT PERFORMANCE

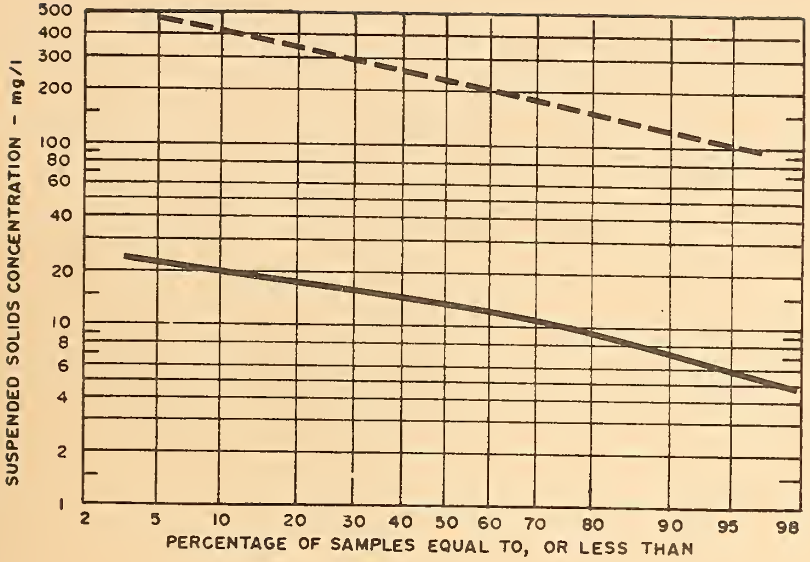
MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW	AVERAGE DAY	MAXIMUM DAY	INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT
	million gallons	mil. gal	mgd	mg/l	mg/l	%	10^3 pounds	mg/l	mg/l	%	10^3 pounds	mg/l P	mg/l P
JAN	218	7.0	9.4	102	12	88	196	233	12	95	481	6.7	3.1
FEB	176	6.0	8.2	320	8	98	548	208	11	95	346	10.0	7.1
MAR	235	7.6	10.0	120	9	93	261	197	12	94	435	6.0	1.6
APR	269	9.0	13.4	280	3	99	744	250	7	97	653	8.6	1.5
MAY	262	8.5	11.9	85	8	91	202	225	12	95	559	4.5	1.9
JUNE	225	7.5	10.8	280	22	92	581	318	14	96	685	9.1	5.8
JULY	241	7.8	10.2	180	16	91	395	213	9	96	492	9.0	3.0
AUG	260	8.4	12.0	95	5	95	234	160	32	80	333	5.5	2.8
SEPT	200	6.6	8.9	240	5	98	468	257	10	96	493	3.8	3.3
OCT	228	7.4	10.6	110	2	98	246	324	7	98	723	7.5	3.8
NOV	299	10.0	11.8	170	5	97	493	165	14	92	451	8.4	1.9
DEC	335	10.8	12.5	120	4	97	401	277	20	93	862	7.6	2.0
TOTAL	2948	-	-	-	-	-	5072	-	-	-	6513	-	-
AVG.	-	8.1	MAXIMUM 13.4	170	9	95	423	240	13	94	543	7.1	3.2
No. of Samples	-	-	-	13	13	-	-	54	50	-	-	13	13

BIOCHEMICAL OXYGEN DEMAND



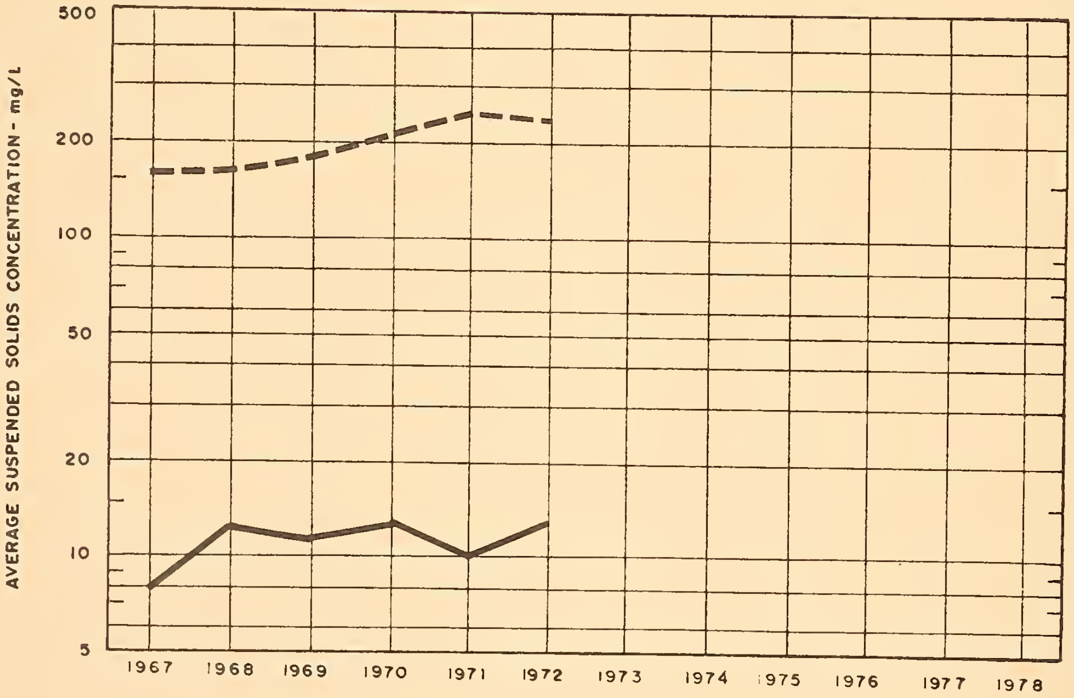


SUSPENDED SOLIDS

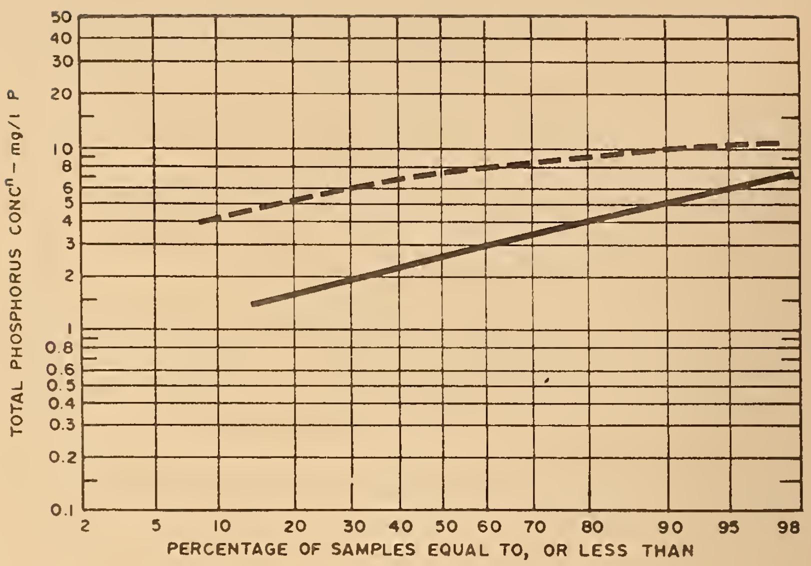


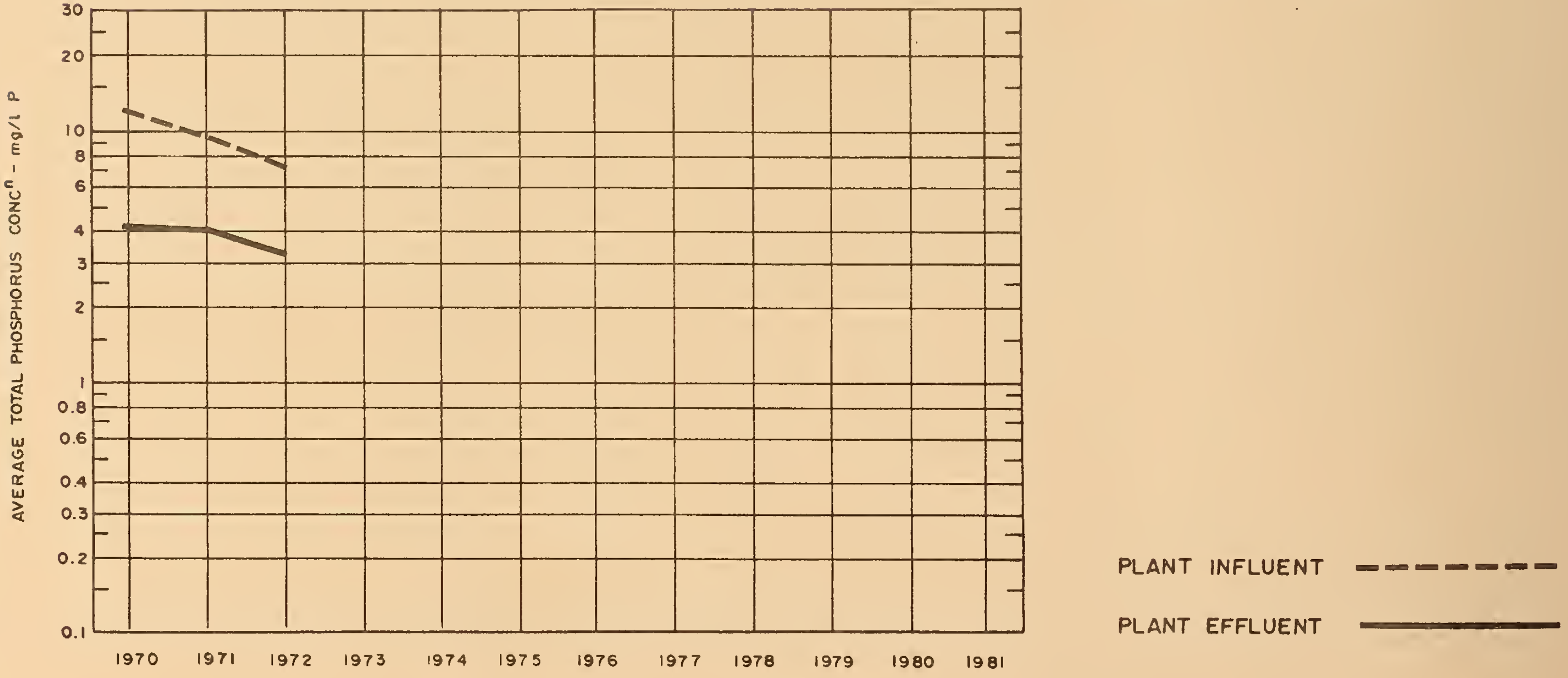
PLANT INFLUENT ╌╌╌╌╌╌

PLANT EFFLUENT ──────



PHOSPHORUS


TOTAL PHOSPHORUS CONCⁿ – mg/l P
50
40
30
20
10
8
6
5
4
3
2
1
0.8
0.6
0.5
0.4
0.3
0.2
0.1
2
5
10
20
30
40
50
60
70
80
90
95
98
PERCENTAGE OF SAMPLES EQUAL TO, OR LESS THAN


AVERAGE TOTAL PHOSPHORUS CONCⁿ – mg/l P
30
20
10
8
6
4
3
2
1
0.8
0.6
0.4
0.3
0.2
0.1
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
PLANT INFLUENT
PLANT EFFLUENT

TREATMENT DATA

MONTH	GRIT	CHLORINATION		AERATION			WASTE SLUDGE			HOLDING TANK			
	QUANTITY REMOVED cubic feet	Cl_2 USED 10^3 pounds	AVG. DOSAGE mg/l	MLSS. CONC mg/l	F/M day^{-1}	AIR USED $\frac{1000 \text{ ft}}{\text{lb BOD}}$	QUANTITY 10 gallons	SUSPENDED SOLIDS mg/l	VOL. SOLIDS %	QUANTITY REMOVED 10 gallons	SUSPENDED SOLIDS mg/l	VOL. SOLIDS %	AMOUNT HAULED cubic yards
JAN	220			3700	.04	1.6		5400					1461
FEB	422			2900	.19	.4		6800			15000		1111
MAR	510			3900	.06	.9		7700			23000		793
APR	190			3200	.23	.3		8500					397
MAY	120	a 3.6	3.0	2900	.08	1.3		7800	69		18000		646
JUNE	330	5.3	2.4	3100	.20	.1		6700	71		16000		1112
JULY	280	5.0	2.1	4200	.09	1.0		9200	67		17000		944
AUG	150	4.8	1.8	5400	.04	2.1		7500	57		18000		834
SEPT	200	4.8	2.4	6300	.06	1.2		10200	77		17000		871
OCT.	530	a 2.6	2.6	4900	.04	2.3		9300	58		17000		648
NOV	150	b .9		4600	.09	.9		10500			16000		671
DEC	360	b 1.6		5400	.06	.8		23000	55		20000		1094
TOTAL	3462	-	–	–	–	–		–	–		–	–	10582
AVG.	1.2 cu. ft/mil gal	28.6	c 2.3	4200	.10	1.1		9400	65		18000		882

a - May 15 - October 15 chlorinated flow 1147. M.G.
b - Plant bypass chlorinated
c - Dose for the period - May 15 to October 15

Date Due

Ontario. Ministry of the Environment. Project Operations Branch.

Burlington-Skyway - Water Pollution Control Plant.

TD227/B87/S69/W38/1972/MOE

DATE	ISSUED TO
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TD227/B87/S69/W38/1972/MOE
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Burlington - Skyway
water pollution ashn
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1972

Burlington ~ Skyway : water pollution control plant.

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